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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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P.O BOX 980			TRAN, BINH X	
VALLEY FORGE, PA 19482-0980			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/706,757

Applicant(s)

CHOU ET AL.

Examiner

Binh X. Tran

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8, 10-17, 19 and 30-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8, 10-17, 19, 30-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-2, 6, 8, 30-32, 34, 36-38, 42-48 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 7, 14, 19 of U.S. Patent No. 5,772,905 in view of Gebhardt et al. (US 5,731,086).

The independent claims 1, 30, 38 of the present application differ from the claim of US 5,772,905 by further specifying the polymeric composition capable of being deformed by said mold at a temperature of less than 200 °C, wherein the polymeric composition comprises an added composition selected from the group of thermosettable polymeric composition, photocurable composition, combination of

thermosettable and photocurable, or combination of thermoplastic with either thermosettable or photocurable polymeric composition. However, the US patent 5,772,905 clearly discloses the use the thermal plastic polymer which is capable of being deformed by the mold. Gebhardt teaches to use thermosettable polymer composition which is capable of being deform at 23.5 °C with superior duplication pattern with minimal loss of debossment precision of the grooved pattern (col. 10 lines 1-35, col. 11-12,) or the mixture of thermoset and thermoplastic (col. 26). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify US Patent 5,772,905 in view of Gebhardt by using thermoset polymer which is capable of being deformed at a temperature less than 200 °C because it has superior duplication pattern with minimal loss of debossment precision of the grooved pattern.

Respect to claim 2 Gebhardt discloses a homopolymer, copolymer. Respect to claim 8, Gebhardt discloses the thermosettable polymer is capable of being deformed at room temperature (col. 10 lines 1-20).

Respect to claims 6, 38, and 42 Gebhardt discloses the polymer comprises a crosslinker (col. 25 lines 1-14, col. 39 lines 55 to col. 40 line 5, col. 40 lines 35-48). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify US Patent 5,772,905 in view of Gebhardt by having crosslinker because it will help to toughening the polymer.

Respect to claims 31-32, Gebhardt discloses the added composition is photocurable or thermsettable polymer. Respect to claim 34, Gebhardt disclose the polymer comprises a hardening composition. It would have been obvious to one having

ordinary skill in the art, at the time of invention, to modify US Patent 5,772,905 in view of Gebhardt by having a hardening composition because it will help to harden the polymer during the curing process.

Respect to claims 36-37, 48 Gebhardt teaches the thermosettable is hardened by a thermal treatment (i.e. curing process) and the photocurable is hardened by UV exposure (col. 11 lines 5-7, col. 25 lines 19-40). It would have been obvious to one having ordinary skill in the art, at the time of invention, to thermally cure or UV cure the polymer because it hardens the polymer.

Respect to claims 43-47, Gebhardt discloses the mold imprint at least one layer of multiple layers of composite (Fig 1B-1F, col. 48).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-2, 6, 8, 16-17, 19, 30-32, 34-36, 38, 42-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haisma (Mold-assisted nano-lithography: A process for reliable pattern replication, American Vacuum Society) in view of Gebhardt et al. (US 5,731,086).

Respect to claims 1 and 30, Haisma discloses a nano-lithography process comprising the step of:

obtaining a mold of a material, which mold is hard relative to the nanoresist film, the nanoresist film comprising a polymeric composition capable of being deformed, the composition is selected from the group of UV-curable polymer (read on "photocurable polymeric composition; See Fig 2, page 4124);

the mold having first and second protruding features spaced apart from each other and a recess formed thereby, the first and second features and the recess having a shape forming a mold pattern and providing at least one mold pattern lateral dimension below 100 nm (page 4124 col. 1, Fig 1, Fig 2);

urging the mold into the film under a molding pressure, wherein the thickness of the nanoresist film under the protruding features of the mold being reduced thereby forming the mold pattern in the nanoresist film, the mold pattern comprising a plurality of structures having at least one dimension less than 200 nm (Fig 2b-2c, page 4125, col. 2);

removing the mold from the film, the polymeric composition retaining said plurality of structure (Fig 2d);

removing from the film the read of reduced thickness (thickness label "r"), thereby exposing portion of the surface of the substrate such that the exposed portions of the substrate substantially replicate the mold pattern and have at least one lateral dimension which is less than 100 nm (Fig 2e, page 4124-4125).

Haisma does not explicitly disclose the polymeric composition is capable of being deformed at a temperature of less than 200 °C. However, Haisma clearly discloses the polymeric composition is capable of being deformed.

Gebhardt teaches to use thermoset polymer composition which is capable of being deform at 23.5 °C with superior duplication pattern with minimal loss of debossment precision of the grooved pattern (col. 10 lines 1-35, col. 11-12,) or the mixture of thermoset and thermoplastic (col. 26). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Haisma in view of Gebhardt by using thermoset polymer which is capable of being deformed at a temperature less than 200 °C because it has superior duplication pattern with minimal loss of debossment precision of the grooved pattern .

Respect to claim 2, Haisma discloses the film comprises a homopolymer, block polymer (page 4124).

Respect to claim 6, Gebhardt discloses to use crosslinker includes divinyl benzene (col. 19 line60 to col. 20 lines 67, col. 25 lines 1-14) as one of the possible resin for the thermosetting. It would have been obvious to one having ordinary skill in

the art, at the time of invention, to modify Haisma in view of Gebhardt by using divinyl benzene because equivalent and substitution of one for the other would produce an expected result.

Respect to claim 8, Gebhardt discloses the polymeric composition is capable of being deformed at room temperature or 23.5 °C (col. 10 lines 10-20, read on "less than about 100 °C).

Respect to claim 16, Haisma discloses the nano-resist comprises a mold release agent, monomers, additive (i.e. photoinitiator) (col. 1 page 4125). Respect to claim 17, Haisma discloses the nano-imprint resist comprise up to 100 weight percent of polymeric composition. Respect to claim 19, Haisma discloses the structures have a dimension of 37.5 nm (page 4126, col. 1, read on "sub-50 nanometer"). Respect to claim 31, Haisma discloses the polymer is a photocurable polymer (i.e. UV-cured polymer).

Respect to claim 32, Gebhardt disclose the composition is a thermosettable polymeric composition (col. 10, col. 11).

Respect to claims 34-35, Haisma discloses the polymeric composition comprises a UV-cure polymer and it is hardened by ultraviolet exposure (Fig 2). Respect to claim 36, Gebhardt discloses the thermosetting composition is hardened by a thermal treatment (i.e. curing) (See col. 10 lines 36, col. 11-12).

Respect to claim 38, Gebhardt teaches to polymer composition further comprises a crosslinker in order to toughening the polymer. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Haisma in view of

Gebhardt by having crosslinker in the polymer because it will help to toughening the polymer. The limitation of claims 42 has been discussed above (See discussion of claim 6).

Respect to claims 43, 46 Haisma disclose the polymeric composition comprises a layer of composites. Respect to claims 43-44, 46-47 Gebhardt discloses the mold imprint at least one layer of multiple layers of composite (Fig 1B-1F, col. 48). Respect to claims 45 and 48, Haisma disclose photocuring the polymer (i.e. UV cured polymer). Respect to claims 45 and 48, Gebhardt also discloses photocuring, or thermally curing the polymer (col. 10 lines 45-55, col. 11 lines 5-8, col. 25 lines 15-40).

6. Claims 3, 10-12, 14-15, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haisma in view of Gebhardt et al. and further in view of Harmening (Molding of Three Dimensional Microstructures by the Liga Process).

Respect to claims 3 and 39, Haisma fails to disclose the polymeric composition comprises poly(methyl methacrylate) or other polymer compound as listed by applicants. Harmening discloses a polymer compound comprise of poly(methyl methacrylate) (PMMA) as the material for the resist layer (page 202-203). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Haisma in view of Harmening by using PMMA because this compound exhibit favorable resist properties (See page 203 col. 2).

Respect to claims 10-12, 14 both Haisma and Harmening fails to disclose the capable curing time, the viscosity, or capable crosslinking time of the polymer material on exposure to radiation. However, Harmening clearly teaches to use a photo-curable

polymer capable of crosslinking and having the identical chemical formula with applicant's polymer compound (i.e. PMMA). Viscosity and capable curing time is a property of the material. According to the MPEP 2112.01, Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. Further, it would have been obvious to one having ordinary skill in the art, at the time of invention, to select a proper curing time, viscosity, because it has been held that there is no invention where the difference in proportions is not critical and was ascertained by routine experimentation because the determination of workable range is not considered inventive.

Respect to claim 15, Harmening discloses the polymeric composition comprises approximately 70 weight percent of monomer (page 204, col. 1).

7. Claims 4, 13, 33, 37, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haisma and Gebhardt in view of Yamamura et al. (US 5,981,616).

Respect to claims 4, 13 and 40, Haisma fails to disclose the polymeric composition comprise an oligomer, wherein the oligomer comprises epoxy resin or polysiloxane. However, Gebhardt clearly teaches the polymeric composition is epoxy (col. 11-12) In a photo-curable composition, Yamamura teaches the polymeric composition comprises an oligomer, the oligomer comprises epoxy resin or polysiloxane (col. 3 lines 34-36, col. 16 lines 10-15). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Haisma and Gebhardt in view

Yamamura by using a polymeric composition comprises oligomer including epoxy resin or polysiloxane because this composition provide a cured products having excellent mechanical strength and minimize shrinkage (abstract).

Respect to claim 33, 37 Haisma and Gebhardt fails to discloses the composition is a mixture a photocurable composition and a thermosettable polymeric composition. However, Haisma clearly discloses the composition comprises a UV-cured polymer (i.e. read photocurable). Gebhardt also discloses the composition comprises photocurable polymer (col. 25 lines 15-40) or thermoset (col. 10-11). Yamamura discloses the composition comprises a mixture of photocurable composition (e.g. photo-initiator) and thermosettable polymeric composition (e.g. epoxy compound; abstract Note: epoxy is a thermosettable). It would have been obvious to one having ordinary skill in the art, at the time of invention to use a mixture of photocurable and thermosettable polymer because this mixture reducing fabricating time and providing cured products having excellent mechanical strength.

Respect to claim 37, Haisma discloses to use ultraviolet exposure on the photocurable polymer. Gebhardt discloses the cure the thermosettable by a thermal treatment and to cure the photocurable by UV exposure (col. 11, col. 25 lines 15-30). Yamamura also discloses to use UV light to cure the polymer composition (col. 20 lines 8-15, lines 55-65).

8. Claims 5, 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haisma in view of Gebhardt and further in view of Ito et al. (US 2002/0102490 A1).

Respect to claims 5 and 41, Haisma fails to disclose the polymeric composition comprise a monomer, wherein the monomer comprises a C₈-C₂₀ alkyl methacrylate, fluorinated alkyl (meth)acrylate monomer, or any combination thereof. However, Haisma clearly teaches the polymeric composition comprises monomer. Ito teaches to polymeric composition comprise monomer, wherein the monomer comprise alkyl methacrylate, fluorinated alkyl methacrylates (paragraph 0039). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Haisma in view of Ito by using the monomer comprise alkyl methacrylate, fluorinated alkyl methacrylates because it will enhance the performance of the photoresist layer.

Response to Arguments

9. Upon further consideration the examiner decides to withdraw the previous allowance subject matter of claim 6.

Respect to obviousness-type double patenting rejection, the applicants argue that "the office has not asserted that any of the polymeric composition recited in amended Claim 1 is disclosed by either claims 1-3, 14, 19 of US Patent 5,772,905, or Napoli". This argument is moot in view of the new ground of rejection. The new cited prior art Gebhardt discloses the polymer comprise thermosetting polymer, or photocurable polymer, and/or thermoplastic polymer.

Respect to the 35 USC 103(a) rejection, the applicants argue "Haisma was published in Nov/Dec. 1996. The instant application is a continuation-in-part of U.S. Ser. No. 10/301,475, filed on Nov. 21, 2002, which is a continuation of U.S. Ser. No. 09/430,602, filed Oct. 29, 1999, which is a continuation-in-part of U.S. Ser. No.

09/107,006, filed Jun. 30, 1998, which is a continuation-in-part of U.S. Ser. No. 08/558,809, filed Nov. 15, 1995. That is, the priority date of the instant application is before the publication date of Haisma. Therefore, the Haisma is not available as a reference". The examiner disagrees. According to the MPEP 2133.01, "When applicant files a continuation-in-part whose claims are not supported by the parent application, the effective filing date is the filing date of the child CIP". Specifically, the examiner is unable to find the proper support for at least one of the following limitation in any of the parent application: "a polymeric composition is capable of being deformed by said mold at a temperature of less than 200 °C"; or the polymeric composition comprise "thermosettable"; or the polymeric comprises "photocurable polymeric composition"; or the polymeric composition comprises "crosslinker" in the independent claims. Since applicants do not have proper support in the parent application the effective filling date is the filing date of the child CIP. This application (10/706,757) is filed on 11/12/2003 claim benefit of 60/425,587 filed on 11/12/2002. Therefore, the effective filing date of this application is 11/12/2002. Haisma was published in Nov/Dec 1996, therefore Haisma is a proper prior art.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Binh Tran

Binh X. Tran